1873MNRAS..33..325H

0h G.M.T.	R.A. h m	N.P.D. ° ′	Δ	$\frac{1}{r^2 \Delta^2}$
1873, Aug. 22	6 3·5	95 8	1·086	0·71
27	6 31·4	93 47		
Sept. 1	7 0·8	92 18	1·023	1·04
6	7 31·6	90 42		
11	8 3·7	89 2	1·002	1·45
16	8 36·8	87 22		
21	9 10·6	85 48	1·031	1·84
26	9 44·7	84 26		
Oct. 1	10 18·3	83 21	1·102	2·08

Sweeping Ephemerides for Tempel's Comet of Short Period. (1867 II.)

(*Communicated by Mr. Bishop.*)

This comet was discovered by M. Tempel at Marseilles on the 3rd of April, 1867, and found by several calculations to be moving in an ellipse with a period of between five and six years. Mr. Searle's orbit in *Ast. Nach.* 1659, is founded upon observations between April 12th and July 24th, and when compared with a normal place deduced from the later observations, by Mr. Julius Schmidt at Athens (August 18th, 19th, and 21st) shows differences of only + 1s·08 in R.A. and + 14″·0 in N.P.D. Mr. Searle's elements, which must therefore be very near the true ones for this apparition, are as follows:—

Perihelion Passage, 1867, May 23·7530 M.T. at Berlin.

	° ′ ″	
Longitude of Perihelion	236 2 34·3	M. Equinox 1867·0.
Longitude of Ascending Node	101 12 49·9	
Inclination	6 23 38·3	
Angle of Excentricity ..	30 30 25·3	
Log. Semi-axis Major ..	0·5014326	
Mean Daily Motion ..	627″·8535 Direct.	

Some time since Mr. Hind had remarked that in the course of the present revolution the comet near its aphelion must approach within 0·4 from the planet *Jupiter*, and it was proposed to determine as accurately as practicable the effect of this close proximity upon the time of next perihelion passage. Before this work could be commenced, it was, however, announced in the publication of the *Astronomische Gesellschaft*, that the comet would be taken in hand at the Observatory of Leipsic, and the projected calculation of perturbations in a rigorous form was consequently relin-

1873MNRAS..33..325H

quished. Without perturbation, according to the above orbit the comet would have again reached its perihelion in the middle of last January, and this time having arrived without any intimation of the results of the work undertaken at Leipsic, it was determined to make an *approximate* calculation of the effect of the attraction of *Jupiter* on the length of the present revolution. The whole of the computation has been performed by Mr. W. E. Plummer, of Mr. Bishop's Observatory, Twickenham. They were continued to 1871, November 17th, at which time the perturbations were becoming comparatively light. The elements had been four times corrected between the previous perihelion passage and this date, the corrected elements being employed in the calculation of co-ordinates, &c., during the following interval.

On November 17th, 1871, the elements of the comet's orbit were found to be approximately, as subjoined :—

Longitude of Perihelion ..	238° 11'·1	From the Mean Equinox.
Longitude of Ascending Node	74 6·1	
Inclination	9 12·6	
Log. Excentricity.. ..	9·66714	or $\varphi = 27° 41'·3$.
Log. Semi-axis Major ..	0·51776	
Mean Daily Motion ..	597''·919	

And the next Passage through Perihelion 1873, May 5·0.

From these elements brought forward to 1873, April 0, the following ephemerides have been computed, the perihelion being assumed, in the first case, to fall on May 5·0, and secondly, four days later, with the view of indicating the line in which the comet should be sought.

The expression for the comet's heliocentric co-ordinates are, (E = the excentric anomaly):—

$$x = [0·47589] \sin (E + 324° 47'·9) + 0·80130$$
$$y = [0·46228] \sin (E + 245 \quad 4·1) + 1·22163$$
$$z = [0·15122] \sin (E + 223 \quad 57·2) + 0·45684$$

During the interval comprised by the ephemerides, the comet is likely to be very faint. At the date of the last observation by Mr. Schmidt at Athens, in August 1867, the intensity of light was 0·21, which is not greatly exceeded in the next period of absence of moonlight. Nevertheless the comet may perhaps be found with some of our larger instruments, and its early discovery and observation for as long a period as possible appears very desirable, as means may thereby be afforded for an independent determination of the mass of *Jupiter*.

1873MNRAS..33..327B

	Perihelion Passage, 1873, May 5·0.				Perihelion Passage, May 9·0.	
0h G.M.T.	R.A.	N.P.D.	Log. Δ	I.	R.A.	N.P.D.
	h m s	° ′			h m s	° ′
March 22	16 24 19	102 30·1	0·0567	0·24	16 13 9	101 23·9
23	25 42	35·3			14 25	28·7
24	27 3	40·6	0·0494	0·25	15 39	33·6
25	28 23	45·8			16 52	38·5
26	29 42	51·1	0·0420	0·26	18 3	43·4
27	30 59	102 56·4			19 13	48·3
28	32 15	103 1·8	0·0347	0·27	20 21	53·3
29	33 29	7·1			21 28	101 58·3
30	34 41	12·5	0·0273	0·28	22 33	102 3·4
31	35 52	17·9			23 36	8·5
April 1	37 1	23·3	0·0200	0·29	24 38	13·6
2	38 8	28·7			25 38	18·8
3	39 14	34·2	0·0107	0·30	26 37	24·0
4	40 18	39·7			27 34	29·2
5	41 20	45·3	0·0055	0·31	28 28	34·5
6	42 21	50·9			29 20	39·8
7	16 43 20	103 56·5	9·9984	0·32	16 30 11	102 45·2

Tempel's Comet of Short Period.

Letter from Dr. Bruhns, Director of the Observatory, at Leipsic, to Mr. Hind, dated 1873, *March* 17.

A pupil of mine, Dr. Seeliger, to facilitate the discovery of the periodical Comet of Tempel, 1867 II, has calculated the perturbations by *Jupiter*. He has started from Mr. Sandberg's elements, and finds,—

	Elements 1867.		Elements 1873.	
T	1867, May, 23·958 Berlin.		1873, May, 8·95 Berlin.	
	° ′ ″		° ′ ″	
π − ☊	134 59 14	M. Eq. 1867·0	160 7 24	M. Eq. 1873·0.
☊	101 10 10		77 58 7	
i	6 24 35		9 54 11	
φ	30 38 39		28 35 4	
μ	623″·044		591″·889	

The time of perihelion in 1873 is retarded fully 117 days by the perturbations. These perturbations are thus large because the comet has approached so near to *Jupiter*: the distances were,—